

Annual Missile Defense Small Business Programs Conference July 21, 2011



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Missile Defense Agency



Purpose and Agenda

Purpose

- How Small Business Impacts MDA thru Advanced Technology (DV)

Agenda

- Small Business Marketplace
- SM-3 Block IIB
- High Power Directed Energy Program
- Advanced Research
- SBIR/STTR
- Overview of Small Business in DV
- Wrap-up





Small Business Marketplace

Marketplaces for Small Business in Advanced Technology

- Subcontracting opportunities with our prime contractors
 - Concept Definition and Program Planning (CDPP)
Contracts for SM-3 Block IIB
(Boeing, Lockheed Martin, Raytheon)
- Advanced Technology Innovation/ Broad Area Announcement (ATI/BAA)
- Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR) programs
 - www.winmda.com
 - New STTR topics to be released 1st quarter FY12
 - New SBIR topics to be released 2nd quarter FY12



U.S. Phased Adaptive Approach Phase 3 and Phase 4

PAA Phase 3 (2018)

Robust capability against IRBMs

Aegis BMD 5.1 with SM-3 IIA

Aegis Ashore 5.1 with SM-3 IB/IIA (two sites)

AN/TPY-2 (FBM)

C2BMC Updates

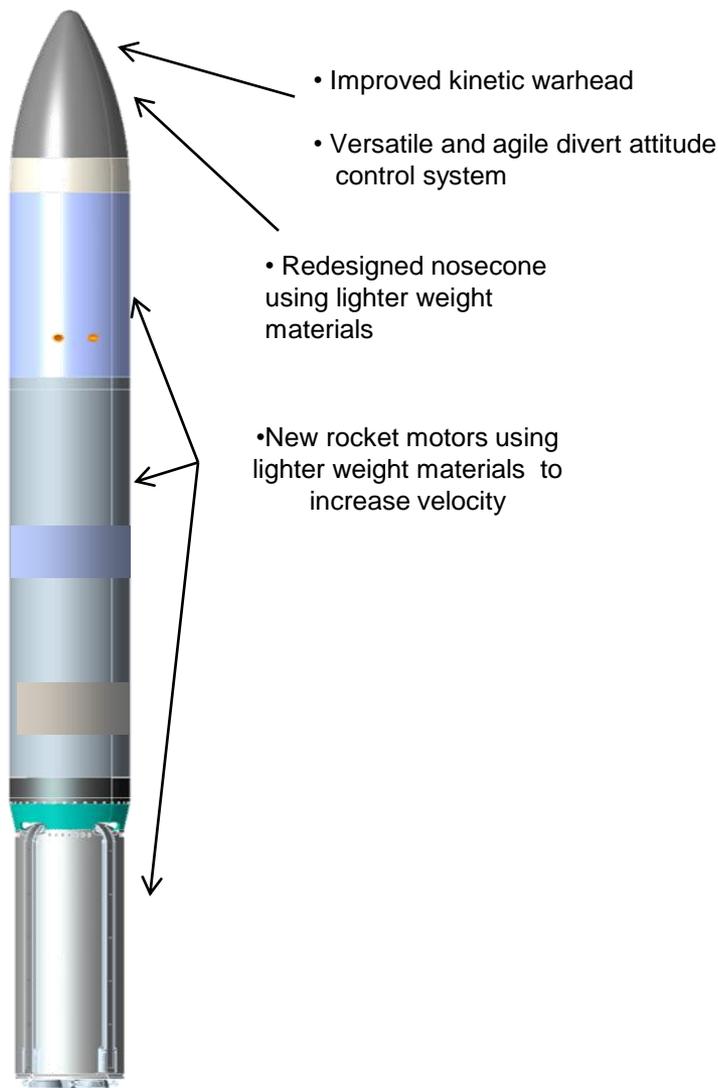
ALTBMD Upper Tier

Potential EPAA Enhancements

THAAD

PTSS

ABIR



PAA Phase 4 (2020)

Early intercept capability against MRBMs and IRBMs; and ICBMs from today's regional threats

Aegis BMD 5.1 with SM-3 IIA

Aegis Ashore 5.1 with SM-3 IIB (two sites)

AN/TPY-2 (FBM)

Enhanced C2BMC

Potential EPAA Enhancements

THAAD

PTSS

ABIR



SM-3 Block IIB

- **Defend**

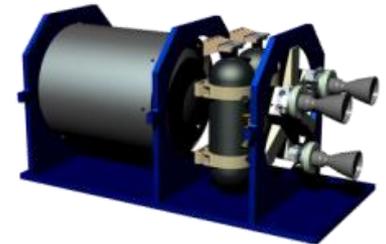
..... Against Intercontinental Ballistic Missiles (ICBM) and regional Medium and Intermediate-Range Ballistic Missiles (MRBM/IRBM) in a cost effective manner

- **Intercept**

..... Early in flight as an element of the layered defense for U.S Homeland and against second generation regional threats in 2020 time frame

- **Engage**

..... On Remote, leveraging BMD distributed sensor architecture and Command, Control, Communications, Computers, Intelligence, Surveillance, Reconnaissance (C4ISR) network of 2020





High Power Directed Energy Program

- Incorporate

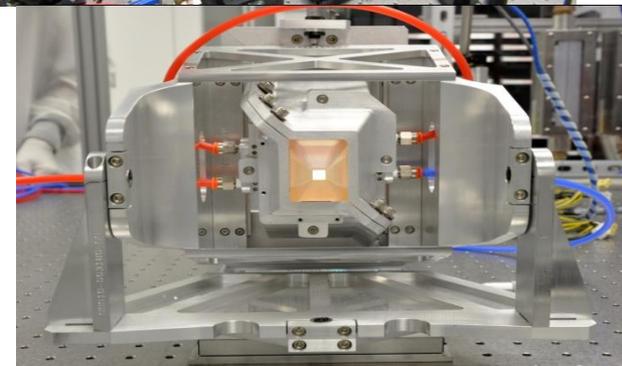
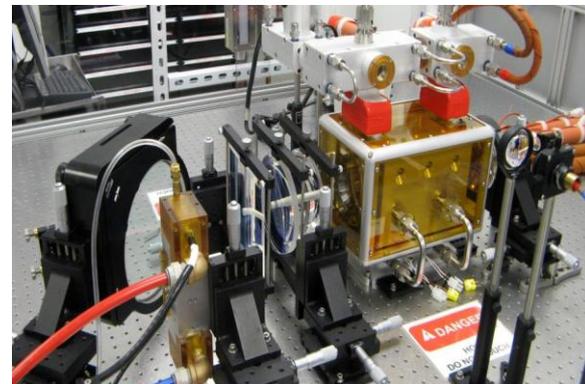
...directed energy technologies to improve laser technology applications against future threats

- Investigate

... advanced laser beam control and characterization of atmospheric propagation effects and provides data for anchoring Directed Energy modeling and simulation.

- Integrate

...use of the Airborne Laser Test Bed to perform integrated laser weapon system demonstrations, provide field test data for model verification & validation, and implement other advanced Directed Energy Research.





Advanced Research

- **Explore**

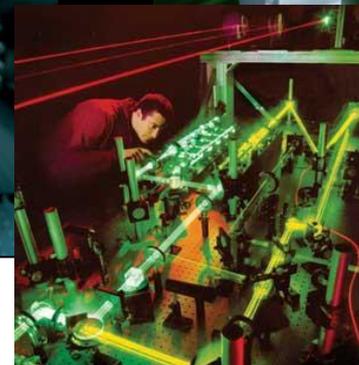
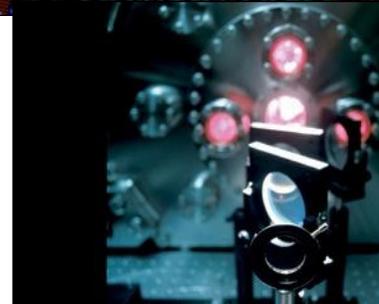
..... new technologies to address future threats and provide improvements in closing gaps in the BMDS

- **Enable**

.....mission success and increases the battle space through research focused across the BMDS on new agency initiatives

- **Integrate**

..... technology and transition maturing research to BMDS programs for implementation





Small Business Accomplishments

SM-3 Block IIB

- Small business subcontracts awarded on all three SM-3 IIB Concept Definition & Program Planning (CDPP) contracts

High Power Directed Energy Program

- SVS purchased by Boeing during the ALTB research contract creating SVS-Boeing, Inc.

Advanced Research

- Kyma Technologies: ATI BAA contract
 - Develop GaN substrate materials produced under varying crystal growth and wafering process conditions;
 - Conduct analysis of critical parameters using a variety of electrical, mechanical, and structural techniques;
 - Utilize the data/results to accelerate the technology readiness of GaN semiconductor materials to support BMDS radar applications



Small Business Innovation Research (SBIR) Small Business Technology Transfer (STTR) Programs

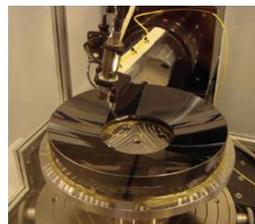
- \$113M program sponsoring research with over 340 Small businesses

- Recent Major contributions include

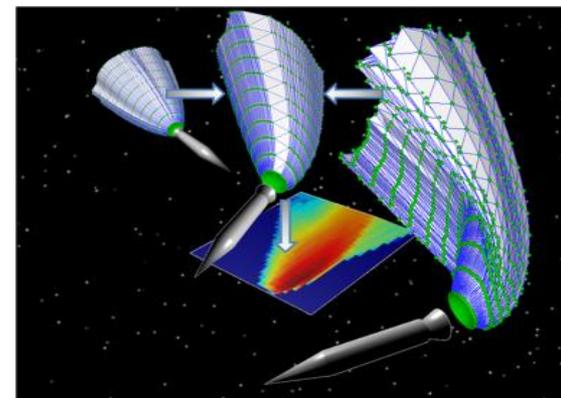
- Improving laser diode spectral narrowing and reliability
 - Development of optical coatings for DPALS windows
 - Beam stabilization and control

- FY11 technology focus areas

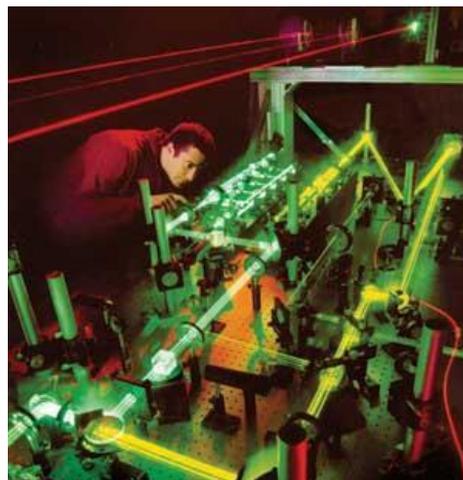
- Modeling and Simulation
- Directed Energy
- Missile Propulsion
- Structures
- Radar and Infrared Sensors and Phenomenology
- Test Support



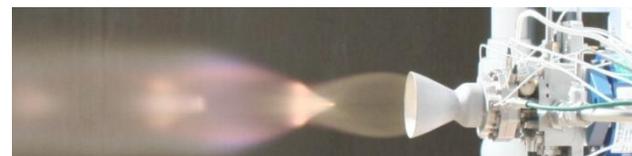
Polishing a Silicon Carbide Mirror



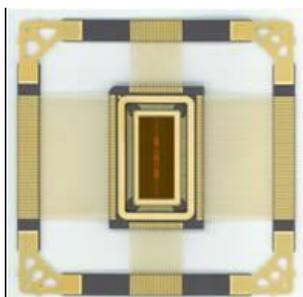
Technique for merging plume models for more accurate scene generation in seeker testing



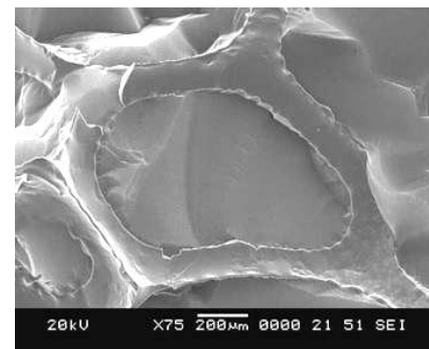
Testing a multiple laser system



Test of integrated valve/injector for bi-propellant thrusters



Radiation-hardened memory chip



Light-weight insulator material imbedded in metal foam

*FY12 Topics
scheduled to be
Released

1st Q and 2nd QFY12

Approved for Public Release

11- MDA-6264 (18 July 11)



SBIR 11.2 SOLICITATION TOPICS

SM-3 Block IIB Research Area	Modeling & Simulation Research Area
Develop and Demonstrate High Performance Infrared Focal Plane Arrays with Advanced Quantum Structures	Characterization and Incorporation of Vernier Engines within the Plume Modeling Process
Composite Structures for lightweight missile components	Advanced Particle Treatment in Modeling Rocket Exhaust Plumes
Hot gas components for lightweight missile components	Intelligent Adaptive Needs Characterization for M&S Systems Engineering
Sensor & Mitigation Technologies for Liquid Hypergolic Propulsion Systems	Improved Techniques for Optimistic Modeling
Advanced Power Storage Systems for Interceptors	Star Background Model
Innovative Propulsion Technology for Missile Defense Interceptors	Automatic Test and Analysis (ATA) Tool
Directed Energy Research Area	Targets & countermeasures Research Area
Methodologies for Accurate Scene Generation of Target Characteristics	Methodologies for Accurate Assessment of Target Characteristics
Methodologies for Accurate Scene Generation of Complex Target Plume Characteristics	Telemetry Impact Reduction for Target Objects
Methodologies for Developing Extremely Large IR Scene Projectors	Passive Techniques for Flight Reconstruction Data
Methodologies for a Partial Frame Correlation of Multiple Sensors	Techniques for Anchoring Debris Models
Smart Infrared Focal Plane Arrays and Advanced Electronics	
Sensors Research Area	C2BMC Research Area
Mitigation of the effects of the ionosphere on UEWR	Innovative Signature Exploitation for Long Range Object Discrimination
Innovative Solid State Power Supply-Modulator for High Power Traveling Wave Tube	Sensor Resource Management
Infrared Research Area	Aegis BMD Research Area
Acquisition, Tracking and Pointing Technologies	Guidance, Navigation and Control Algorithms and Hardware for Advanced Interceptors
Development of line-narrowed diode pumps sources for DPAL systems	Long-Term Missile Aging Reliability Prediction for Advanced Platforms
Development of optical quality thin-film coatings for DPAL windows	
Israeli Program Research Area	Anti-Tamper Research Area
Light Weight Divert and Attitude Control Systems for Missile Defense Interceptors	Anti-Tamper Technology for Missile Defense



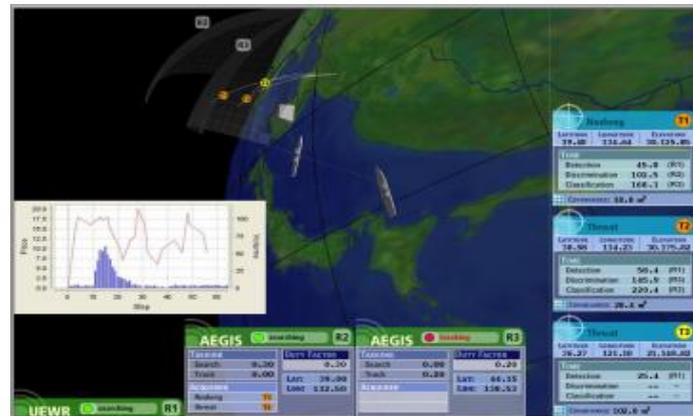
DV SBIR Accomplishments

Problem: The task of efficiently and effectively assigning the BMDS sensors presents a complex challenge

Solution: Charles River analytics developed software that:

- Optimizes networked sensors
- Determines threat levels
- Produces tasking plans for radars

Used in Enhanced Command, Control, Battle Management and Communication (EC2BMC) development plans



Problem: Needed to improve ball bearing smoothness for BMD Seekers and Sensors

Solution: Brycoat successfully qualified a Swiss process for coating ball bearings with titanium carbide provides:

- Precise positioning
- Smooth performance
- High reliability

Used in High Performance Seekers

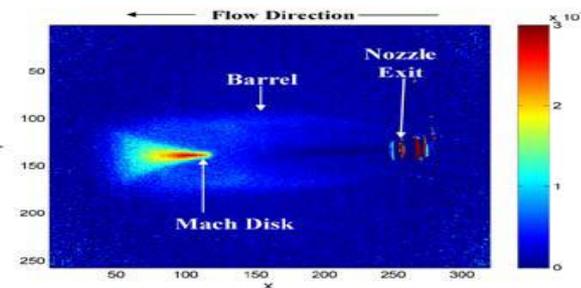


Problem: Identified deficiencies in the modeling of low thrust plume signatures

Solution: Low-thrust plume signature modeling for Aegis, THAAD and GMD

- Developed by Spectral Sciences and Physical Science, Inc.

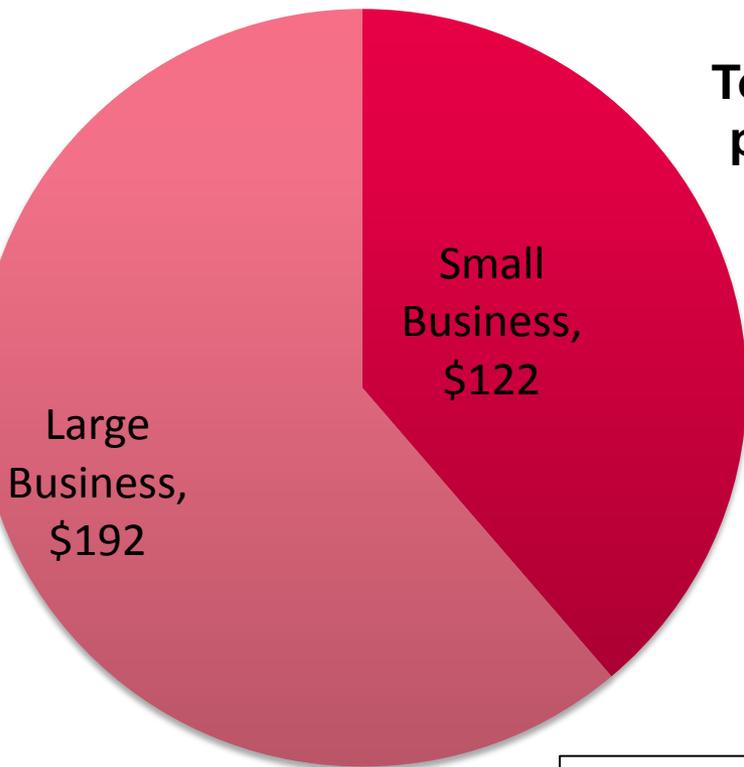
Chemistry packages incorporated into MDA's high altitude plume flowfield code used by Aegis BMD





Small Business in DV

Funding breakout

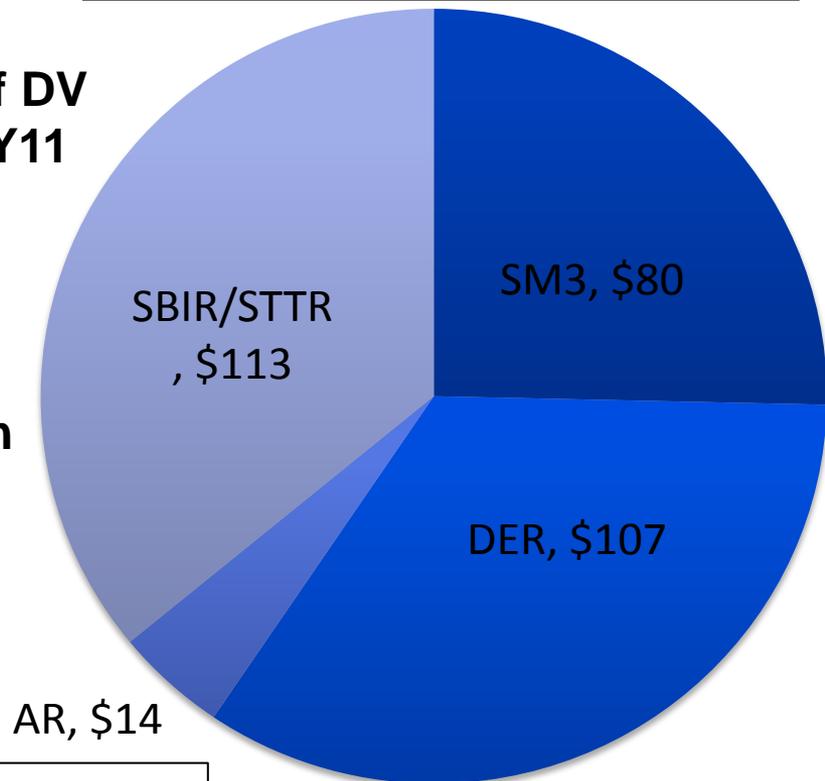


Total funding of DV programs in FY11
\$314.7M

Total Small Business Participation
\$121.87M

Large Business- 61.27%
Small Business- 38.73%

Total Funding for DV





Summary

- Missile Defense Advanced Technology Programs are on the critical path to counter emerging BMDS threats
- SM-3 Block IIB Technology Development structured to complete in FY13
- Directed Energy Research Emphasis
- Aggressive use of SBIR/STTR Programs and leveraging of University Research to hedge for the future
- MDA realizes the value of and looks to small business to lead the way in creative BMDS solutions to current and future Gap needs





Acronyms

ABIR-	Airborne Infrared	LDACS-	Liquid Divert Attitude Control System
ACS-	Attitude Control System	LLNL-	Lawrence Livermore National Laboratory
AFRL-	Air Force Research Laboratory	MARTI-	Missile Alternative Range Target Instrument
ALTB-	Airborne Laser Test Bed	MiDAESS-	Missile Defense Agency Engineering and Support Services
AO-	Adaptive Optics	MIT/LL-	Massachusetts Institute of Technology/Lincoln Laboratory
ATI-	Advanced Technology Innovation	M & S-	Modeling and Simulation
BAA-	Broad Agency Announcement	MSSA-	Modeling, Simulation, Software and Analysis
BMD-	Ballistic Missile Defense	NEI-	Noise Equivalent Irradiance
BMDS-	Ballistic Missile Defense System	NFIRE-	Near Field Infrared Experiment
C4ISR-	Command, Control, Communications, Computers, Intelligence, Surveillance, Reconnaissance	OASIS-	Architecture Simulation Interface Specification
CPI-	Continuous Process Improvement	OPIR-	Overhead Persistent Infrared
DACS-	Divert Attitude Control System	OSF-	Objective Simulation Framework
DER-	Directed Energy Research	PAA-	Phase Adaptive Approach
DPALS-	Diode Pumped Alkali Laser System	PTSS-	Precision Tracking Space System
DSA-	Digital Simulation Architecture	SBIR-	Small Business Innovation Research
EC2BMC-	Enhanced Command, Control, Battle Management and Communication	SBX-	Sea Based Radar
EKV-	Exo-atmospheric Kill Vehicle	SDACS-	Solid Divert Attitude Control System
EO-	Electro-Optical	SiC-	Silicon Carbide
EPAA-	European Phase Adaptive Approach	SLS-	Strained Layer Super-lattice
FPA-	Focal Plane Array	SM-3 IIB-	Standard Missile Block IIB
GaN-	Gallium nitride	SSF-	Single Stimulation Framework
GBI-	Ground-Based Interceptor	STSS-	Space Tracking and Surveillance System
HALO-	High Altitude Low Orbit	STTR-	Small Business Technology Transfer
HCT/MCT-	Mercury Cadmium Telluride	TBB-	Terrier Black Brant
HEL-	High Energy Laser	THAAD-	Terminal High Altitude Area Defense
HRCS-	High Run Count Simulation	YAG-	Yttrium aluminum garnet
IR-	Infrared	YB-	Ytterbium
JTO-	Joint Technology Office		